REMARKS

The Abstract and Specification have been amended in order to correct grammatical and idiomatic errors contained therein. No new matter has been added.

In order to expedite the prosecution of the present application, claim 1 has been amended in order to state that the activated carbon has an activity of greater than 90% CTC prior to impregnation. Newly presented claims 42-45 are directed to preferred embodiments of the present invention. No new matter has been added.

Claims 37 and 38 have been amended in order to address the rejection under 35 USC §112, second paragraph. As such, it is respectfully submitted that this rejection is no longer applicable. Claims 1, 27-30, 32 and 37-41 have been rejected under 35 USC §102(b) as being anticipated by Keith II et al. (Keith). Claim 31 has been rejected under 35 USC §103(a) as being unpatentable over Keith. Claims 33-36 have been rejected under 35 USC §103(a) as being unpatentable over Keith in view of Crooks et al. or Frund. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

There are many types of cigarette filters existing in the marketplace which use activated carbon to remove undesirable vapor phase components from tobacco smoke. It has recently been desired to develop a cigarette filter that can selectively remove specific compounds from tobacco smoke while allowing others to remain. One particular compound for which selective removal is particularly desired is hydrogen cyanide, which is a well-known poisonous compound. Although hydrogen cyanide can be removed by standard activated carbon filters, these conventional filters do not achieve any selective removal of hydrogen cyanide and, in fact, usually remove hydrogen cyanide less effectively than other vapor phase components.

Gas masks and respirators use activated carbon impregnated with various chemicals to enhance the removal of

particular compounds through chemical reaction as well as absorption. However, the use of these respirator activated carbons in cigarette filters have been relatively ineffective because only low levels of overall removal are obtained due to the lower contact time between the activated carbon and the tobacco smoke. These respirator-grade activated carbons also do not exhibit any enhanced selectivity toward removing hydrogen cyanide. This would suggest that it is necessary to have a high loading of an impregnant in activated carbon in order to effect the removal of hydrogen cyanide from cigarette tobacco smoke.

The present invention is based on the discovery that a tobacco smoke filter containing activated carbon having an activity of greater than 90% CTC prior to impregnation and which are then impregnated with the metal impregnant and expectedly show a high selectively with respect to the removal of hydrogen cyanide from tobacco smoke and unexpectedly does not show a market decrease and performance when containing a lower level of metal impregnation. It is respectfully submitted that the references cited by the Examiner do not disclose the presently claimed invention.

The Keith reference discloses a cigarette filter containing activated carbon which can be impregnated with from about 0.5 to 14% by way of an oxide of a metal selected from the group consisting of cobalt, copper, zinc, iron, silver and molybdenum, either singly or in combination. However, the activated carbons of this reference are not activated carbons having a high activity. The claims of this reference refer to a carbon of at least one million square centimeters per gram ($100m^2/g$) and Column 2, line 52 of this reference refers to a "good grade" having a surface area of in excess of $500m^2/g$. No other measure that relates to the activity of the carbon is disclosed in this reference. For coconut shell carbons, there is a reasonably well known relationship between surface area and CTC activity. This relationship shows a surface area of $500m^2/g$ corresponds to 30% CTC. An activity of 90% CTC, as

required by the present claims, corresponds to a surface area of 1,500m^2/g for activated carbon provided from coconut shell carbons. In this reference, experiments use only BPL carbon supplied by Calgon carbon. The specification of this carbon, as provided by the manufacturer, shows it to have a butane activity of 23.3%, which is equivalent to about 60% CTC. As such, this reference does not disclose a "high-activity" activated carbon having an activity of greater than 90% CTC prior to impregnation as required by the present claims or suggest the unexpected advantages associated with the tobacco smoke filter of the present invention. Therefore, the currently presented claims clearly are patentably distinguishable over the Keith reference, and, as will be discussed below, the secondary references combined with the Keith reference do not present a showing of prima facie obviousness under 35 USC §103(a).

The Crooks et al. reference is directed to a filter element incorporating an adsorbent material and has been cited by the Examiner as disclosing that a cigarette filter can contain activated carbon that is impregnated with metals and has a carbon tetrachloride activity of 60 to 150. In this reference, activating carbons having a 60 to 150% CTC range are disclosed as being equivalent. Therefore, nothing in this reference suggests that using an activated carbon having a CTC of at least 90% would result in improving the properties of the cigarette filter and, in fact, all the specific examples in this reference use activated carbon having 85% CTC activity. As such, Crooks et al. combined with the primary Keith reference, at best, presents a showing which can be rebutted by the objective evidence of unobviousness which is presented in the instant specification.

The Frund reference discloses a respirator filter system suitable for filtering toxic agents, including organic vapors, acid gases, formaldehyde, ammonia, methylamine and pesticides. As discussed in the present specification, activated carbons used in respirators are not suitable for use in cigarette

filters because they require a longer contact time and do not show any selectivity with respect to the other vapor components contained in tobacco smoke. Nothing in Frund suggests that the activated carbon disclosed there for use in a respirator filter system would be suitable for use in a cigarette filter. As such, Applicants respectfully submit that only hindsight provided by the present disclosure has provided the motivation for the Examiner to attempt the combination of Frund with the Keith reference.

Objective test data is of record in the present application which is more than sufficient to rebut any proper showing of prima facie obviousness under 35 USC §103(a). In Table 1 of the present specification, respirator carbons such as used in Frund are tested against a standard cigarette filter for main vapor phase reduction percent and hydrogen cyanide reduction percent. As can be seen by the results in Table 1, the respirator carbons were not suitable for the cigarette filter environment and that they showed a very low hydrogen cyanide reduction, low vapor phase reduction and low selectivity toward hydrogen cyanide.

Table 3 in the present specification tested 14 impregnated activated carbon samples prepared according to Table 2 with the carbons having a different activity. As can be seen by the results contained in Table 3, sample numbers 1, 2, 4, 9 and 10 which had an activity of less than 90% CTC all exhibited inferior hydrogen cyanide reduction and selectivity as compared to the activated carbon falling within the scope of the present claims. It is clearly shown that in order to achieve a higher reduction of vapor phase material in combination with the higher reduction of hydrogen cyanide, it is necessary to use an activated carbon having a high activity of greater than 90% CTC in combination with a comparative low level of metal impregnation. Nothing in the prior art cited by the Examiner suggests that using an activated carbon having a high activity of greater than 90% CTC will provide superior vapor phase contaminant removal in combination with selective

hydrogen cyanide removal and permit the reduction of the metal content needed for metal impregnation. Therefore, it is respectfully submitted that the presently claimed invention is clearly patentably distinguishable over the prior art cited by the Examiner.

Reconsideration of the present application and the passage and the issuance is respectfully solicited.

Respectfully submitted,

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